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Heart Failure

ACUTE KIDNEY INJURY ASSOCIATED WITH INTRAVENOUS FUROSEMIDE: INCIDENCE, INDEPENDENT RISK FACTORS, AND CLINICAL CONSEQUENCES

ACC Moderated Poster Contributions
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Background: Aggressive administration of intravenous (IV) furosemide can lead to acute kidney injury (AKI). The purpose of this study was to determine the incidence, independent risk factors and clinical outcomes associated with furosemide-induced AKI in hospitalized patients.

Methods: This was a prospective, observational study. Data were collected from 2400 patients admitted to the Cardiac Medical Critical Care unit at an urban academic medical center. Patients were included in the analysis if they were ≥ 18 years of age and received ≥ 1 dose of IV furosemide for pulmonary edema associated with acute heart failure. AKI was defined, using the Risk-Injury-Failure-Loss-End-stage kidney disease (RIFLE) criteria, as ≥ 1 of the following: doubling of serum creatinine from admitting value; decrease in calculated glomerular filtration rate > 50% from admitting value; urine output < 0.5 ml/kg/hr for 12 hours. Factors with univariate p values ≤ 0.10 were included in the multivariate analysis.

Results: A total of 720 patients met inclusion criteria. Furosemide-induced AKI occurred in 53% of patients. Patients who developed AKI were more likely to die during hospitalization (15% vs 5%, p<0.001) and were more likely to be readmitted within 30 days of hospital discharge (22% vs 12% p<0.001). Independent risk factors for development of furosemide-induced AKI were: age ≥ 75 years [odds ratio 1.10, 95% confidence interval 1.00-1.49], chronic kidney disease [1.64 (1.12-2.26)], concurrent angiotensin-converting enzyme inhibitor use [1.73 (1.22-2.56), left ventricular ejection fraction < 40% [1.30 (1.21-2.00)], admission weight ≥ 90 kg [1.00 (1.02-1.32)], coronary artery disease [1.40 (1.08-2.11)], and receipt of ≥ 2 nonscheduled (stat) IV doses of furosemide [1.28 (1.13-1.38)]. Total furosemide dose and maximum daily furosemide dose were not independent risk factors for furosemide-induced AKI.

Conclusions: AKI associated with IV furosemide occurs commonly in patients hospitalized with pulmonary edema due to acute heart failure, and is associated with multiple independent risk factors. Furosemide-induced AKI is associated with increased in-hospital mortality and 30-day readmission rates.